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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

YOUNG, SHAWQUA

ART UNIT	PAPER NUMBER
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1626

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/579,319	Applicant(s) KRIZANOVIC ET AL.	
	Examiner SHAWQUIA YOUNG	Art Unit 1626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-9 are currently pending in the instant application.

I. *Response to Arguments/Remarks*

Applicants have filed an amendment on July 29, 2008,

Applicants have overcome the objection of claim 7 as being a substantial duplicate of claim 6. The objection has been withdrawn.

However, Applicants arguments with respect to the rejection of claims 1-9 under 35 USC 112, first paragraph, as failing to comply with the written description requirement; the rejection of claims 1-9 under 35 USC 112, second paragraph as being indefinite; the rejection of claims 1-9 under 35 USC 103 as being unpatentable over Alicot, et al. and the rejection of claim 3 under 35 USC 112, second paragraph as being indefinite are not persuasive and the rejections are maintained.

Applicants traverse the rejection of claims 1-9 under 35 USC 103 as being unpatentable over Alicot, et al. (US 4,371,698). Applicants restate their argument from the previous amendment. Applicants interpret the Alicot, et al. reference as dealing with purification of 2-mercaptobenzothiazole (2-MBT) in aniline, consists primarily in returning the aniline filtrates from the product purification into the system. To prevent accumulation of impurities, which originate in the synthesis reactor, during continued recycles of used filtrates, it is necessary to remove a part of the used filtrates from the system. The amount of removed filtrates should correspond with the content of impurities in the raw product, i.e. if the raw product contains 5-10% of impurities, the

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corresponding amount of the filtrate should be removed from the system to keep mutual equilibrium in the composition of the system streams. Applicants further argue that the difference between the Alicot, et al. reference and the instant application consists in the necessity to thicken (concentrate) by distillation enormous amounts of aniline filtrates from crystallization and from washing. Applicants emphasize that with the solution according to the instant application, it is not necessary to concentrate the aniline filtrates, the necessity of distillation falls away, which fact may be considered to be the most substantial contribution. Applicants state that "in contrast to the method disclosed in the prior art, according to the instant application: 1) the parts of liquid phases, which are returned into the process, are not thickened (concentrated) at all and 2) the not thickened liquid phase is at the same time (simultaneously) returned to two places of the process: into the synthesis reactor and to the stage of subsequent crystallization.

The Examiner maintains the position in the previous Office Action and will restate the position. The Examiner wants to point out that Applicants' claims are not fully supported by the original specification. The Examiner maintains the position that the method in the claims is different from the method in the specification. Applicants' specification (page 6) states that "crystals of 2-MBT are precipitated, which are separated and the liquid phase (filtrate from crystallization, F_k) is used in the next batch." Then it states that "The obtained cake of crystallized product is processed with a minimum amount of fresh aniline and pure product is separated from the resulting mixture. The obtained liquid phase F_R from final purification is recycled by charging it into the next crystallization". This step is different from in the claims. Step (e) in the

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claims state that "final purification of the crystallized 2-MBT from step (a) stirred in the *aniline liquid phase* and separation of the pure product 2-MBT from the liquid phase (F_R) from the purification". Applicants do not have that fresh aniline is used in the final purification of the crystallized 2-MBT from step (a) as stated in the specification. The claims state that the crystallized 2-MBT is stirred in the *aniline liquid phase*. What aniline liquid phase? According to the claims the 1st part of the liquid phase is removed from the process, the 2nd part is returned to the reactor and the 3rd part is not used until step (f). That is the first difference. Another difference under the disclosure of the invention section, as mentioned in the previous Office action, the liquid phase after crystallization of 2-MBT and then the separation of the crystals, is only divided into two portions (See page 6). This part discussed F_k and F_r liquid phases but do not discuss the three parts F_{k1} , F_{k2} and F_{k3} . That is a difference between the two methods. The Examiner has maintained the rejection.

The Examiner has maintained the position of the rejection of claims 1-9 under 35 USC 103(a) because Applicants are simply restating the same arguments as in the previous Office Action and have not posed any new arguments.

The Examiner maintains the position that batch and continuous processes are not patentably distinct absent unexpected results (See *In re Dilnot*) for the reasons stated in the previous Office Action. Applicants' arguments have not shown that the instant claims are not obvious over the prior art reference of Alicot, et al. Therefore, the rejection of claims 1-9 under 35 USC 103 is maintained.

The Examiner has maintained the rejection of claims 1-9 under 35 USC 112, second paragraph as being indefinite. Applicants allege that they have amended step (e) in claim 1 to specify that pure aniline is used but they have not.

The Examiner has maintained the rejection claim 3 under 35 USC 112, second paragraph as being indefinite because Applicants still have not amended the claim to clarify which batch of 2-MBT raw product is being referred to in claim 3.

II. *Rejection(s)*

Claim Rejections - 35 USC § 112, 1st paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Specifically, method of claims 1-9 is not described in the original specification in the manner that they are written in the claims. The method disclosed in Applicants' claims is different from the method disclosed in the original specification. The Examiner will interpret both methods. According to the instant claims, 2-MBT is obtained from a melt of raw product that is prepared in a synthesis reactor by the reaction of aniline, carbon disulphide and sulphur, wherein the melt contains 2-MBT, unreacted starting materials, intermediate products and pitches. The 2-MBT raw product is crystallized from an aniline solution. The crystallized MBT is

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apparently separated from the aniline solution because applicants discuss the presence of a liquid phase. The liquid phase from the crystallization is divided into three parts (F_{k1}), (F_{k2}) and (F_{k3}). One part of the liquid phase (F_{k1}) is removed out of the process. The second part (F_{k2}) of the liquid phase is returned to the synthesis reactor for the preparation of the raw product and sulphur and carbon disulphide is added to the reactor. Step (e) is completely unclear. The Examiner interprets that the crystallized 2-MBT obtained from step (a) is added to the second part of the liquid phase (F_{k2}), is purified a second time and the "pure 2-MBT" is separated from second part of the liquid phase (F_{k2}). Then the third part of the liquid phase (F_{k3}) from the crystallization in step (a) is combined with the liquid phase from step (e) and optionally aniline is added for crystallization of a further batch of 2-MBT raw product. Then steps a) to f) are repeated. This is the method described by the instant claims.

However, Applicants' specification discloses a different method. According to the original specification, the 2-MBT raw product from the synthesis reactor is dissolved in an excess of pure aniline. The solution is cooled down and crystals of 2-MBT are precipitated and separated from liquid phase (F_K). The crystallized 2-MBT is washed with fresh aniline and the pure product is separate from the liquid phase (F_R). Then 1/3 of the liquid phase (F_K) is placed into the synthesis reactor and reacted with sulphur and carbon disulphide. The raw product of 2-MBT is dissolved in the remained (2/3) of the liquid phase (F_K) and is then combined with the liquid phase (F_R). At this point all of the liquid phases are combined in one container. After cooling, the crystals of the second batch of 2-MBT are precipitated and separated from the liquid phase. The crystals of the

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second batch of 2-MBT are washed with pure aniline and filtered. Then 1/3 of the liquid phase is placed into the synthesis reactor and the above method is repeated. (See pages 5-7 and working example 2)

According to the original specification, the initial liquid phase obtained is not separated into three parts. The initial liquid phase is only separated into two parts and one part is not removed from the process. The first part of the liquid phase (1/3 of the liquid phase) is reintroduced to the reactor and reacted with sulphur and carbon dioxide. The second part of the liquid phase (the remaining 2/3) is combined with the liquid phase (F_R) which was obtained from washing and filtering the crystallized 2-MBT a second time. Applicants have not claimed their invention that is disclosed in the original specification. Therefore, the specification lacks adequate support for Claims 1-9.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Step (e) of claim 1 states the limitation of the "final purification of the crystallized 2-MBT from step a) in the aniline liquid phase and separation of the pure product 2MBR from the liquid phase (F_R) purification". It is unclear what is meant by this step. Is the crystallized 2-MBT being dissolved in the second part of the liquid phase or is it being dissolved in fresh aniline. What liquid

phase is the crystallized 2-BT present in?

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. According to claim 1, there are different batches of the 2-mercaptobenzothiazole raw product that are being crystallized and it is unclear which batch Applicants are referring to.

35 USC § 103 - OBVIOUSNESS REJECTION

The following is a quotation of 35 U.S.C. § 103(a) that forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Graham v. John Deere Co. set forth the factual inquiries necessary to determine obviousness under 35 U.S.C. §103(a). See *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Specifically, the analysis must employ the following factual inquiries:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Alicot, et al.*, US Patent No. 4,371,698 (February 1, 1983). Applicants claim a method of obtaining 2-mercaptobenzothiazole from a melt of the raw product prepared by the reaction of aniline, carbon disulphide and sulphur by pressure synthesis in a reactor, where the melt contains 2-mercaptobenzothiazole, unreacted raw materials, intermediate products and pitches, characterized in that after reaching a stationary state of the reaction medium the method consists of the following steps:

- a) crystallization of the 2-mercaptobenzothiazole raw product from an aniline solution,
- b) dividing the liquid phase from crystallization from step a) in three parts (FK1), (FK2) (FK3),
- c) removing one part of the liquid phase (FK1) from crystallization out of the process,
- d) returning the second part of the liquid phase (FK2) from crystallization into the reactor for preparation of the raw product and supplementing it with sulphur and carbon disulphide with respect to aniline,
- e) final purification of the crystallized 2-mercaptobenzothiazole from step a) stirred in the aniline liquid phase and separation of the pure product 2-mercaptobenzothiazole from the liquid phase (FR) from the purification,
- f) using the third part of the liquid phase (FK3) from crystallization, supplemented with the liquid phase (FR) from final purification from step e) and possibly with aniline for crystallization of a further batch of the 2-mercaptobenzothiazole raw product, as in step

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a),

g) repeating steps a) to f).

The Scope and Content of the Prior Art (MPEP §2141.01)

Alicot, et al. teaches the purification of mercaptobenzothiazole. The reference reads on a process for the purification of mercaptobenzothiazole which comprises the steps of adding aniline to the crude product resulting from the reaction of aniline, sulfur and carbon disulfide in the reactor where the synthesis took place. The reference further teaches in detail the purification in three stages. Stage 1 comprises the addition of aniline to the crude reaction product to precipitate out the mercaptobenzothiazole. Stage 2 comprises filtration and washing in aniline of the precipitated mercaptobenzothiazole. Stage 3 comprises the recycling of the liquid phases of the purification medium to reuse the unreacted starting material.

The Difference Between the Prior Art and the Claims (MPEP §2141.02)

The difference between the prior art of *Alicot, et al.* and the instant invention is that the applicants are dividing the liquid phase from the crystallization into three parts before recycling whereas the reference does not specifically teach dividing the liquid phase before recycling.

Prima Facie Obviousness-The Rational and Motivation (MPEP §2142-2413)

In *In re Dilnot*, 319 F. 2d 188, 138 U.S.P.Q. 248 (C.C.P.A. 1963), it was well

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established that batch and continuous processes are not patentably distinct. Dividing the liquid phase from the crystallization into three parts before recycling in a well known process is a mere optimization and does not make the process patentably distinct absent unexpected or unobvious results. Therefore, it would have been prima facie obvious to one having ordinary skill in the art at the time the invention was made to separate the liquid phase from the purification step in various parts before recycling the starting materials.

III. Conclusion

THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shawquia Young whose telephone number is 571-272-9043. The examiner can normally be reached on 7:00 AM-3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph McKane can be reached on 571-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shawquia Young/

Examiner, Art Unit 1626

/Kamal A Saeed/

Primary Examiner, Art Unit 1626